CHAPTER 3

MATERIALS AND EQUIPMENT CONSIDERATIONS

3-1. General considerations. The structural design and the specifications relating to materials and to construction will provide for sturdy construction of all parts of the incinerator. In this respect, the effects of expansion and contraction due to high-temperature change will be considered. The type of construction will, in general, be as indicated on the standard drawings and in the guide specification listed in appendix B.

3-2. Furnace. The furnace will be constructed with an inner and outer shell. The walls of the inner shell and the arch will be approximately 9 inches thick and constructed of high-duty fire-clay brick or constructed of refractory plastic material having equivalent qualities. Firebrick will be laid in high-temperature, air-setting, bonding cement. The arch will be covered with a 2-1/2-inch layer of insulating material. The side walls of the outer shell will be 8-inch common brick walls securely braced to prevent settling and cracking. The bracing will consist of upright corner angles and intermediate upright channel buck stays, tied with rods and horizontal steel angles. The tie rods will be entirely outside the inner shell and will not be in contact with the refractory material at any point. The top, forming a part of the outer shell, will be reinforced concrete. If the top is not needed as a floor or as a roof for protection against the weather, it may be omitted and the arch covered with a 4-inch layer of common brick on top of the insulating brick. There will be no physical connections between the inner shell and the outer shell except the skewbacks of the arches, where the outer shell will be properly braced to take the arch thrust, and except around openings. The inner and outer shells will be separated by suitable insulating material or air space. The bridge wall and target wall will be 13-1/2-inches thick in incinerators of 1,000 pounds per hour capacity or larger and 9 inches thick in smaller sizes.

3-3. Stack. The stack will be constructed with an inner shell of fireclay brick for the entire height and an outer shell of common brick. The outer shell will be separated by a 2-inch air space from the inner shell and will have no physical contact with it at any point. The stack may be square or circular; however, the cross-sectional area will be the same for either shape.

3-4. Damper. The damper will be a movable vertical slab constructed of refractory material, steel shapes, and tie rods. It will be located in the flue and will fit freely in guide grooves. Suitable means, such as a chain hoist or cables, pulleys, and counterweights, will be

provided for raising and lowering the damper. A damper box will be provided for housing the damper in its open position.

3-5. Furnace doors. The size, type, and location of the furnace doors will be determined with a view toward convenience of incinerator operation. The following comments relate to the doors of incinerators of 1,000 pounds per hour capacity or larger: Types I and II incinerators require means of charging the drying hearth with wet material. This can be accomplished through a charging throat extending from the furnace arch to the operating floor above. A removable lid will be provided for the charging throat. The charging of the grate with dry material is best accomplished through a guillotine type of door. In a type I incincerator this door will be in the side of a hood that extends above the operating floor and is directly above the grate. Both types I and II will be provided with a guillotine firing door in the side wall immediately above the grate. The guillotine doors and the lid on the charging throat will be constructed of refractory material. Cast iron furnace doors approximately 18 by 24 inches will be installed in the side wall of the furnace just above and opposite the drying hearth and at the firing-floor level opposite the mixing chamber, the combustion chamber, and the ash pit. The charging hood, the charging throat, and all openings will be adequately lined with refractory material.

3-6. Grate. The grate will be cast iron. The total area of the opening will be such that the loss of draft through the grate and refuse will not exceed the allowances indicated in paragraph 2-4.

3-7. Incinerator layout. Facilities will be carefully planned for the ready discharge of the refuse from delivery trucks directly on the charging floor or on a platform where it will be readily accessible for charging into the furnace. Space will be provided on the charging floor for storing refuse when the rate of delivery exceeds the furnace capacity for burning. Floor drains with removable, cast iron, slotted drain covers will be provided on both the charging floor and the firing floor.

3-8. Instrumentation. For purposes of controlling the temperature within safe limits for the refractory material, the combustion chamber will be provided with an indicating-recording pyrometer. A draft gage of the inclined tube type that will indicate the draft in the combustion chamber in inches of water is desirable.

3-9. Heat recovery equipment. Garbage cans, when emptied at the incinerator, will be soaked in hot water, then sprayed with hot water inside and outside. Water may be heated for this purpose by means of a hot-water pipe located in the combustion chamber and connected to a hot-water storage tank of required capacity.